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AUTHOR Breckon, Steven
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ABSTRACT

This report describes the success of the LaHarpe (Illinois) Community Unit School District in raising student math scores on the Illinois Goal Assessment Program (IGAP). Low IGAP test results and faculty dissatisfaction with scores precipitated the school district to modify the content and delivery of math instruction based on student needs identified in the IGAP test. The traditional textbook approach in the elementary grades and practical math for less able high school students were replaced with "Math Their Way" methods in grade school and a modified 2-year algebra class in high school for those not taking college preparatory math. Junior high school math curricula were modified to include math electives of pre-algebra and algebra in the seventh and eighth grades. Further upgrading at the senior high level included adding calculus to the curriculum. Meetings were held to inform parents of the changes and solicit their cooperation. Over the 6 years of the program (1991-1997), test scores were raised 73 points and exceeded the state average by 31 points. (SAS)

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LEADERSHIP FOR CHANGING THE SMALL RURAL SCHOOL: THE EXCITEMENT OF SCHOOL IMPROVEMENT

By

Dr. Steven Breckon, Superintendent

LaHarpe Community Unit School District #335

LaHarpe, Illinois

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Leadership for Changing the Small Rural School:

The Excitement of School Improvement

Low test scores indicate need for change

What do school personnel do if their student's scores are low and too many students are not meeting state and local assessment standards? The usual answer is to raise student scores through increasing learning standards. While increasing standards may sound easy, doing so requires a significant amount of planned work. The LaHarpe, Illinois, Community Unit School District has been successful in raising their student Illinois Goal Assessment Program (IGAP) math scores by using just such methods: increasing standards and planned work to change the curriculum to reach the standards set forth.

Terminology such as Illinois Goal Assessment Program (IGAP), local assessment, student performance, performance standards, and school accreditation/quality review causes great anxiety among many rural administrators, as well as among their urban and suburban counterparts. Students are tested in the areas of mathematics, writing, reading, social studies, and science. Scores are reported back to the school districts where the scores become part of a local school report card that is distributed to the public, enough pressure to cause anxiety in the best of administrators. Schools with students scoring poorly on the IGAP are listed on a state office produced Academic Watch List. Obviously, no one wants his or her school on this poor performance list. Furthermore, the entire school accreditation process is designed to determine if the students are meeting state and local performance standards in school.

LaHarpe personnel took the position that these assessments "tell what students know and don't know, not how they compare to other students. ..they assess the extent to which individual students master key objectives selected from the district's academic standards. They make it possible for teachers to teach to the identified needs of the students."1 They agreed that if our school was to meet state standards, as well as score satisfactorily on the IGAP, measures must be taken to improve the

math curriculum. They agreed with the premise of Schiller and Saltrick that teachers must adjust the content and delivery of classroom instruction based on identified student needs.1 It was obvious that we were not meeting these needs. As John Abbott so aptly puts it, we needed to turn learning upside down and inside out in our district math department.2

Demographics of LaHarpe Community Unit School District

LaHarpe Illinois is a rural school district of 520 students in Western Illinois. It is generally a farming community of law-abiding, basically conservative, people who value public education, as exemplified by the passing of a 1994 school building bond issue, the first time on the ballot, with a 60% "yes" vote. When I came to the LaHarpe School District at the beginning of the 1991-92 school year, our math curriculum consisted of a traditional textbook based K-8 arithmetic program, with practical math available for less adept high school math students and a sequence of Algebra I, Geometry, Algebra II/Trigonometry, and Analytic Geometry for college prep students.

This math program was an example of an inadequate curriculum for the 1990's. Some students were fulfilling their high school math graduation requirement by taking two years of practical math. These students were not getting adequate math education

for today's society. They were not getting an adequate enough math experience to meet state standards for math knowledge at the 10th grade level. These students did not have any understanding of basic algebra. Needless to say, these students did not perform well on the State of Illinois IGAP tests because they had not had an opportunity to learn much of the math tested on the IGAP exam.

This poor performance was not the fault of the students, but the fault of the school. The students were not provided an opportunity to learn what was going to be asked on the state IGAP test. We knew if we wanted students to perform better on the IGAP math tests, we must provide instruction in higher level math skills. With this requirement, the faculty and administration began to revise the math curriculum.

Although changing the math program at LaHarpe did not come about because of the U.S. Department of Education report on mathematics, nor because of Gerald Bracey's book entitled **FINAL EXAM**, these two documents underscore the importance of the changes made during the past seven years. These changes were based on the philosophy that every student can learn. They also came about because there was dissatisfaction among the faculty

about the success of their students in math. The faculty was not content to accept the premise that all children can learn is unrealistic.3 They were determined to change their curriculum and did so successfully.

Table 1 reports the IGAP math test results that document the below average scores of the high school students on the math test in the 1991, 1992, and 1994 years. We were surprised by the 1994 score after the improvement in 1993, and have no explanation for this one year drop in scores. As shown in Table 1, the overall student math scores at the high school level have improved greatly with the revision of the math curriculum.

The curriculum was changed to increase student learning and thereby increased student test scores. If we had just improved our efficiency with the same old lower level curricular material, the students would have covered the lower level material more thoroughly and not learned the higher level material necessary. To improve student scores, it is necessary to teach higher level material. We knew we must raise the standard of learning for the subject.

Changes in the math curriculum

This change began during the summer of 1991 when two elementary faculty members attended a workshop on the concepts of "Math Their Way". Their goal was to find a better way to teach

math to the K-4 students. In an effort to relieve the negative connotation attached to math, the elementary staff investigated several math instructional methodologies. The teaching methods of "Math Their Way" impressed the elementary faculty and a small number of them began using this method. Soon, their success with this teaching method became known to other faculty members, and they also adopted this approach to teaching math. "Math Their Way" is a teaching method using many manipulative items and hands-on activities in teaching the concepts of math. Students remain interested in math and regard it as a pleasant experience.

While the elementary faculty was gaining comfort in the acceptance of math through the "Math Their Way" approach, the high school staff had received their student's IGAP scores and were not satisfied with those results as a valid indicator of the level of quality instruction within the school. Upon analyzing the situation, the high school principal and teachers became aware of the option allowed by the school district for students to learn less, rather than more, by only taking practical math in high school. The high school had for many, many, years offered students the option of two years of practical math to meet graduation requirements. This practice mislead the students and community into thinking practical math was all the math needed for success in today's work world. About half of the

students took practical math and about half took algebra and geometry. The result was obvious. With half of the student body not getting instruction in algebra, the school's average math IGAP scores were very poor. To score well on the IGAP test, students must have basic algebra competencies.

After identifying this lack of a rigorous math program as the major problem, the principal and faculty investigated solutions. The solution of choice was to eliminate practical math from the high school curriculum and replace it with a slower paced Algebra I. The school community realized additional time on the same old practical math was blocking student progress. Those traditional practical math students had covered repeatedly the same material since about the 7th grade. It was time for this group of students to explore new horizons and experience the concepts of math through algebra.

This quest for a fresh approach resulted in the adoption of a two year Algebra I sequence providing a more deliberate, slower paced, presentation of the same material covered in the traditional one year college prep Algebra I class. The students in this two year Algebra I course cover the material with more detailed steps and additional examples and practice. Over a two year period, students master Algebra I skills.

Prior to implementing the new algebra course and

discontinuing the old practical math course, parents of the students who were impacted were invited to discuss the change. These meetings allowed for school district personnel to present the need for changing the curriculum and answer questions from concerned students and parents. Some parents and faculty felt there would be students failing algebra. Through group discussion, they all recognized that some students, too many, were already failing practical math. The comment was made, "They may as well be allowed the opportunity to learn algebra, it will benefit many students. If they are going to fail, it does not make much difference if they fail algebra or practical math."

The new algebra course created new successes for many students. These students, in large part, had previously felt they were failures in math and just could not master the concepts of practical math. Once in the algebra course, they found the application of practical math through the language of algebra made things more understandable. The students achieved new levels of math knowledge and gained much needed confidence. The psychological concept of confidence being a result of accomplishment and accomplishments gaining further with increased confidence was evident in these students.

When these students took the Illinois Goal Assessment Program (IGAP) test, their scores were very much improved, with

90% meeting or exceeding the state goals for math. The change to a higher level curriculum brought success to students, the district, and pride to all.

Elimination of practical math from curriculum

As these changes were taking place. the principal and faculty of grades six through eight were evaluating the math curriculum for junior high students. They were in the practical-math-mode as had been the case for many years. The decision was made to raise the level of instruction for the junior high students. The idea was to offer the math electives of pre-algebra and algebra to the seventh and eighth graders. The junior high math teacher met with all junior high parents and talked about offering a math elective system to the seventh and eighth grade students.

The U.S. Department of Education's "Mathematics Equals Opportunity" report states that 38% of young people who go on to college take "the important gateway math courses" in eighth grade. Low-income students who took algebra and geometry were nearly three times more likely to attend college as those who did not take these math courses. The report further states that taking these courses is more important than the type of school attended. 4

The math elective system for LaHarpe seventh grade students

consisted of a choice of a problem solving-based math course or pre-algebra. Eighth graders had the choice of high school college prep Algebra I or the pre-algebra course. Through direct parental involvement, these electives were implemented very easily. As the program was refined, fifth and sixth grade students were introduced to the problem solving-based math approach.

With a large number of students taking Algebra I in the junior high, the need for further upgrading of the high school math curriculum became apparent. After further examination and discussion with the principal, faculty and the school community, it was decided to add calculus to the high school curriculum. The addition of calculus was another success for students and the school district.

Table 1 clearly shows the long term success of this curricular revision. Tenth grade student math scores have stayed well above the state average for the past three years. As students with junior algebra and/or pre-algebra enter the high school and progress to the tenth grade, they have higher level math skills and knowledge with which to meet the challenges of the IGAP test.

TABLE 1

ILLINOIS GOAL ASSESSMENT PROGRAM

AVERAGE SCORES IN MATHEMATICS 1991-1997

LAHARPE HIGH SCHOOL

TEST YEAR	AVERAGE SCORE		
SPRING 1991	LHS	232	JUNIORS TESTED
	STATE	250	
SPRING 1992	LHS	242	JUNIORS TESTED
	STATE	251	
SPRING 1993*	LHS	276	SOPHOMORES TESTED
	STATE	250	
SPRING 1994	LHS	239	SOPHOMORES TESTED
	STATE	254	
SPRING 1995	LHS	286	SOPHOMORES TESTED
	STATE	259	
SPRING 1996	LHS	275	SOPHOMORES TESTED
	STATE	262	
SPRING 1997	LHS	295	SOPHOMORES TESTED
	STATE	264	

*1992-93 DROPPED PRACTICAL MATH FROM HIGH SCHOOL CURRICULUM AND REPLACED IT WITH A TWO YEAR ALGEBRA I SEQUENCE

TWO YEARS OF MATH CREDIT IS A GRADUATION REQUIREMENT

Revision of overall math curriculum K - 12

These actions completed a major revision of the overall math curriculum. The faculty continues to refine instructional areas within the total Pre-K - 12 system to perfect math instruction further. As we reflect back on this period of curriculum reform, we must credit the state IGAP test with being the stimulus to make us improve the opportunities provided our students. These changes were very much needed and have been successful. The use of a plan of gradual change, one small step at a time, with each change event proved to be beneficial to the success of the entire change effort.

The catalyst for LaHarpe teachers was three-fold: elementary teachers learned a new way to deliver math to their students, the junior high teachers were brave enough to improve their curriculum, and the high school faculty raised the level of instruction in the 9 - 12 math curriculum! As Arthur Combs so aptly stated: "We have been trying to change education by changing things, but people behave on how things seem to them....Recognize the significance of teachers and what they believe about themselves, others, and their purpose...."5 In LaHarpe, it took teachers to make the difference.

This success story addresses only the math curriculum and the changes required to provide the opportunity for students to reach higher levels of learning in math. A similar process could be used to revise curriculum in other subject matter areas. Educators all across the nation must thoroughly examine what they are teaching to determine if it is providing adequate opportunity for today's students. We encourage other educators to use this process and call us for advice and ideas if needed. As rural educators, we recognize the extreme importance of education to our more isolated constituency. Their life long success is a product of K-12 education. We must constantly work to change the system to maintain current relevance. It is too easy to get behind, and impossible to get ahead of today's technologically driven world.

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